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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,710	02/11/2002	Jes Asmussen	MSU 4.1-572	5422
21036	7590	05/31/2005	EXAMINER	
MCLEOD & MOYNE, P.C. 2190 COMMONS PARKWAY OKEMOS, MI 48864			FULLER, ERIC B	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/073,710

Applicant(s)

ASMUSSEN ET AL.

Examiner

Eric B. Fuller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 6 and 7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

In view of the appeal brief filed on March 14, 2005, PROSECUTION IS HEREBY REOPENED. Specifically, the applicant argued that the grain size was not taught by the prior art. After careful reconsideration, it was determined that the nucleation density was one order of magnitude too small to meet this limitation. Accordingly, the examiner has withdrawn the rejections of the final Office Action. The new grounds of rejection are set forth below. Finality has also been withdrawn and by action of this paper the case is under a non-final rejection.

To avoid abandonment of the application, appellant must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 or,
- (2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 8-12, 14-17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruen et al. (US 6,592,839) in view of Asmussen et al. (US 5,311,103).

Gruen teaches a method of forming a nanocrystalline diamond film by plasma CVD. The grain size is taught in column 4, line 35. The plasma is formed by radiofrequency and or microwave (column 4, lines 15-20). It is explicitly taught to exclude oxygen and other gases (column 15-20). It is taught in one embodiment to use only argon as the inert gas (column 4, line 24-30), which reads on excluding nitrogen. The argon is used in the claimed concentration (column 8, lines 1-10). The pressure reads on the applicant's claimed pressure range (column 4, line 40-47). The nucleation step reads on roughening the substrate (column 4, lines 50-65). The temperature is taught in column 4, line 61. The reference does not explicitly teach performing the plasma CVD process in the claimed apparatus.

However, Asmussen teaches an apparatus for depositing diamond films on silicon substrates (abstract). The apparatus reads on the applicant's claims (column 12, lines 7-47). The benefits of using the apparatus is that it is economical to construct and reliable to use and produces excellent results (column 5, lines 1-5). Additionally, the tunable features allow for efficient use, as extra plasma requiring extra power is not produced. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the apparatus of Asmussen to perform the method

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of Gruen. By doing so, one would reap the benefits of efficient use, economical construction, a reliable apparatus, and excellent results.

Claims 1-5, 8-12, 14-17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruen et al. (US 6,592,839) in view of Asmussen et al. (US 5,311,103).

Gruen teaches a method of forming a nanocrystalline diamond film by plasma CVD. The grain size is taught in column 4, line 35. The plasma is formed by radiofrequency and or microwave (column 4, lines 15-20). It is explicitly taught to exclude oxygen and other gases (column 15-20). It is taught in one embodiment to use only argon as the inert gas (column 4, line 24-30), which reads on excluding nitrogen. The argon is used in the claimed concentration (column 8, lines 1-10). The pressure reads on the applicant's claimed pressure range (column 4, line 40-47). The nucleation step reads on roughening the substrate (column 4, lines 50-65). The temperature is taught in column 4, line 61. The reference does not explicitly teach performing the plasma CVD process in the claimed apparatus.

However, Asmussen teaches an apparatus for depositing diamond films on silicon substrates (abstract). The apparatus reads on the applicant's claims (column 12, lines 7-47). The benefits of using the apparatus is that it is economical to construct and reliable to use and produces excellent results (column 5, lines 1-5). Additionally, the tunable features allow for efficient use, as extra plasma requiring extra power is not produced. It would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to use the apparatus of Asmussen to perform the method of Gruen. By doing so, one would reap the benefits of efficient use, economical construction, a reliable apparatus, and excellent results.

Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruen et al. (US 6,592,839) in view of Asmussen et al. (US 5,311,103), as applied to claims 1 and 2 above, in further in view of Herb et al. (US 5,273,790).

Gruen, in view of Asmussen, teaches the limitations of claims 1 and 2, as shown above, but fails to teach using molybdenum as the substrate holder. However, Herb teaches that the holder should be fabricated from materials chosen to exclude carbon, in order to eliminate a potential uncontrollable source of carbon. Materials suitable for use include molybdenum (column 6, lines 61-65). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize molybdenum as the substrate holder. By doing so, one would reap the benefits of preventing uncontrollable sources of carbon.

Claims 1-5, 8-12, 14-17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruen et al. (US 6,592,839) in view of Asmussen et al. (US 4,585,668).

Gruen teaches the limitations above, but fails to explicitly teach performing the plasma CVD process in the claimed apparatus.

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However, Asmussen teaches an apparatus that reads on the applicant's claims (column 13, lines 5-44). The benefits of using the apparatus is that it is economical to construct and reliable to use and produces excellent results (column 6, lines 60-68). Additionally, the tunable features allow for efficient use, as extra plasma requiring extra power is not produced (column 10, lines 29-35). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the apparatus of Asmussen to perform the method of Gruen. By doing so, one would reap the benefits of efficient use, economical construction, a reliable apparatus, and excellent results.

Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruen et al. (US 6,592,839) in view of Asmussen et al. (US 4,585,668), as applied to claims 1 and 2 above, and further in view of Herb et al. (US 5,273,790).

Gruen, in view of Asmussen, teaches the limitations of claims 1 and 2, as shown above, but fails to teach using molybdenum as the substrate holder. However, Herb teaches that the holder should be fabricated from materials chosen to exclude carbon, in order to eliminate a potential uncontrollable source of carbon. Materials suitable for use include molybdenum (column 6, lines 61-65). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize molybdenum as the substrate holder. By doing so, one would reap the benefits of preventing uncontrollable sources of carbon.

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Claims 1-5, 8-12, 14-17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruen et al. (US 6,592,839) in view of Asmussen et al. (US 4,906,900).

Gruen teaches the limitations above, but fails to teach performing the plasma CVD process in the claimed apparatus.

However, Asmussen teaches an apparatus that reads on the applicant's claims (column 10, lines 9-49). The benefits of using the apparatus is that it is economical to construct and reliable to use and produces excellent results (column 1, lines 59-68). Additionally, the tunable features allow for efficient use, as extra plasma requiring extra power is not produced. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the apparatus of Asmussen to perform the method of Gruen. By doing so, one would reap the benefits of efficient use, economical construction, reliable apparatus, and excellent results.

Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruen et al. (US 6,592,839) in view of Asmussen et al. (US 4,906,900), as applied to claims 1 and 2 above, and further in view of Herb et al. (US 5,273,790).

Gruen teaches the limitations of claims 1 and 2, as shown above, but fails to teach using molybdenum as the substrate holder. However, Herb teaches that the holder should be fabricated from materials chosen to exclude carbon, in order to eliminate a potential uncontrollable source of carbon. Materials suitable for use include molybdenum (column 6, lines 61-65). It would have been obvious at the time the



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invention was made to a person having ordinary skill in the art to utilize molybdenum as the substrate holder. By doing so, one would reap the benefits of preventing uncontrollable sources of carbon.

Claims 1-5, 8-12, 14-17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruen et al. (US 6,592,839) in view of Asmussen et al. (US 4,727,293).

Gruen teaches the limitations above, but fails to teach performing the plasma CVD process in the claimed apparatus.

However, Asmussen teaches an apparatus that reads on the applicant's claims (column 14, lines 5-44). The benefits of using the apparatus is that it is economical to construct and reliable to use and produces excellent results (column 1, lines 35-45). Additionally, the tunable features allow for efficient use, as extra plasma requiring extra power is not produced. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the apparatus of Asmussen to perform the method of Gruen. By doing so, one would reap the benefits of efficient use, economical construction, reliable apparatus, and excellent results.

Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruen et al. (US 6,592,839) in view of Asmussen et al. (US 4,727,293), as applied to claims 1 and 2 above, and further in view of Herb et al. (US 5,273,790).

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Gruen, in view of Asmussen, teaches the limitations of claims 1 and 2, as shown above, but fails to teach using molybdenum as the substrate holder. However, Herb teaches that the holder should be fabricated from materials chosen to exclude carbon, in order to eliminate a potential uncontrollable source of carbon. Materials suitable for use include molybdenum (column 6, lines 61-65). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize molybdenum as the substrate holder. By doing so, one would reap the benefits of preventing uncontrollable sources of carbon.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-5, 8-12, 14-17, and 19 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, and 4 of U.S. Patent No. 4,585,668 in view of Gruen et al. (US 6,592,839)

Claims 1, 2, and 4 of the patent teaches the applicant's claimed method steps, but fails to claim depositing diamond. However, Gruen teaches a diamond deposition process that requires plasma CVD. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to perform the diamond deposition of Gruen by the method of the U.S. Patent. By doing so, one would have a reasonable expectation of success, as the patent teaches a plasma deposition process and Gruen requires plasma deposition.

Claims 1-5, 8-12, 14-17, and 19 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 22-27 of U.S. Patent No. 4,585,668 in view of Gruen et al. (US 6,592,839)

Claims 22-27 of the patent teaches the applicant's claimed method steps, but fails to claim depositing diamond. However, Gruen teaches a diamond deposition process that requires plasma CVD. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to perform the diamond deposition of Gruen by the method of the U.S. Patent. By doing so, one would have a reasonable expectation of success, as the patent teaches a plasma deposition process and Gruen, requires plasma deposition.

### ***Conclusion***

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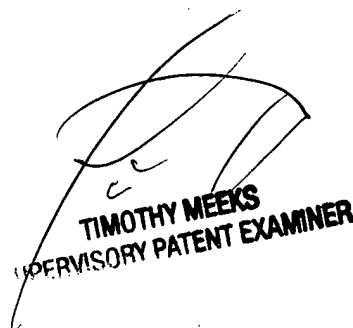
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Fuller whose telephone number is (571) 272-1420. The examiner can normally be reached on Mondays through Thursdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks, can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



EBF



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SUPERVISORY PATENT EXAMINER